

# Delaware Science and Technology Council

## Inaugural Meeting

October 4, 2005

## The Perfect Storm

### **Shirley Ann Jackson, President of RPI:**

“To arrest the perfect storm we need a full-fledged national commitment to invest in basic research, in science and engineering. We need a national commitment to reignite the interest in science and mathematics of all of our children and a national commitment to identify, nurture, mentor, and support the talent that resides in our new majority population.”

The perfect storm is due to: US scientists are aging, immigration rules are discouraging foreign students from entering the US, Asian nations are turning out more grads, and US students are less interested in the field.

UPI  
June 29, 2004

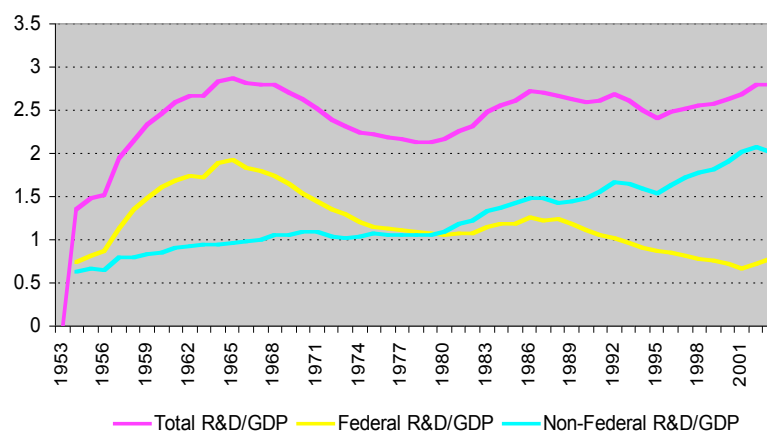
## S&E Graduates

- Number of science and engineering graduates in 2003:
  - U.S. – 400,000
  - China – 337,000
  - India – 316,000
  - Russia – 216,000

Source: *Innovate America*, p. 11

### Federal Commitments to R&D Have Waned

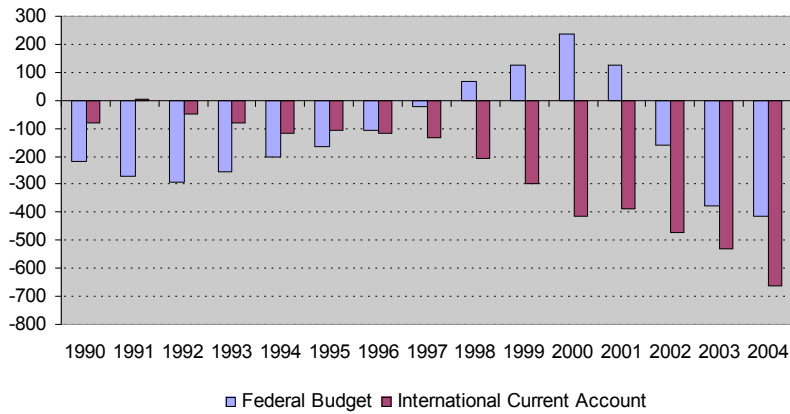
US R&D Expenditures as a percentage of GDP: 1953-2002



SOURCE: National Science Foundation/Division of Science Resources Statistics.

## Increase in U.S. Trade Deficit Accompanied by Growing Federal Budget Deficit

*Federal Budget and Current Account Deficits, Billions of Dollars*



SOURCE: Global Insight, Inc.

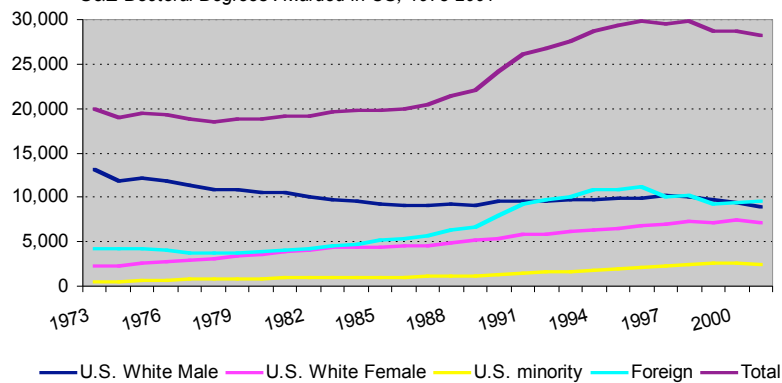
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## Noncitizens Account for Growth in S&E Doctorates in US

*S&E Doctoral Degrees Awarded in US, 1973-2001*



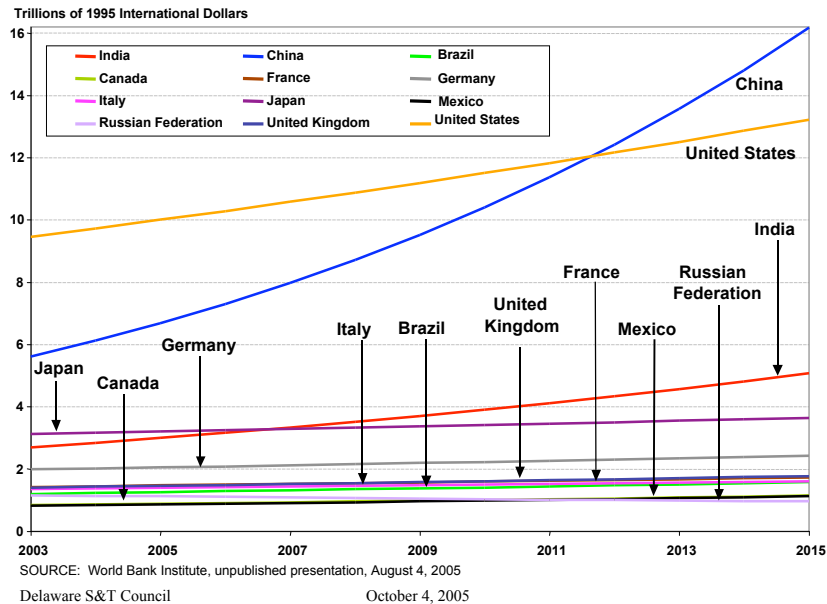
SOURCE: National Science Foundation, *Science and Engineering Indicators* – 2004.

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## Real GDP (PPP): Projections 2004 - 2015 (Using 1991-2003 Average Growth Rates)



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## Intensity of Industrial R&D:2001

- National average is 1.88% of GNP
- States above national average:
  - 4. Rhode Island 3.2%
  - 6. New Hampshire 3.02%
  - 9. Delaware 2.73%
  - 10. Idaho 2.42%
- States below national average:
  - 15. ND 1.84%
  - 17. VT 1.82%
  - 23. KS 1.49%
  - 31. TN 0.83%
  - 32. SC 0.78%
  - 33. AL 0.77%
  - 35. ME 0.67%
  - 37-39. OK, KY, NE <0.60%
  - 40-41. WV, NM <0.50%
  - 43-47. AR, NV, SD, MS, MT
  - 48-51. AK, LA, HI, WY =<0.25%

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## Educational Attainment:2002

- National average of population 25 and older with bachelor's is 26.7%
- States above national average:
  - 8. Vermont 30.8%
  - 10. New Hampshire 30.1%
  - 12. Delaware 29.5%
  - 13. Kansas 29.1%
  - 19. Nebraska 27.1%
  - 21. Hawaii 26.8%
- States below national average:
  - 27. Alaska 25.6%
  - 28. New Mexico 25.4%
  - 29. North Dakota 25.3%
  - 33, 35, 37. ME, SD, MT, RI, SC <24%
  - 39, 42. AL, LA, NV <23%
  - 42. LA and NV 22.1%
  - 44-45. KY and TN <22%
  - 46-48. ID, MS, OK <21%
  - 49-51. WY, AR, WV <20%

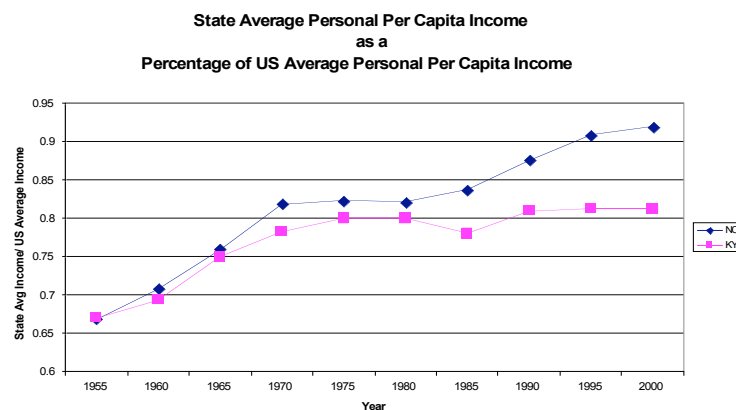
## Brain Gain vs. Brain Drain

- 18 states gained young, single, and college educated from 1995-2000
- EPSCoR exporters:
  - 19. Delaware
- EPSCoR importers:
  - 9. Nevada
  - 15. Tennessee
  - 16. Alaska
  - 18. Idaho
- EPSCoR exporters:
  - 20s. Wyoming, Maine, Hawaii, Vermont, South Carolina, Arkansas, South Dakota, Montana
  - 30s. New Mexico, New Hampshire, Kentucky, North Dakota, Nebraska, Rhode Island, West Virginia, Mississippi
  - 40s. Kansas, Oklahoma, Alabama, Louisiana

## Academic R&D from Industry: 2003

- National average is 5.40%
- States above national average:
  - 1. Alaska 16.42%
  - 3. Nebraska 7.33%
  - 8. Vermont 7.03%
  - 14. Louisiana 5.91%
  - 15. Idaho 5.86%
  - 16. Oklahoma 5.83%
- States below national average:
  - 20. SC 5.28%
  - 21. AR 5.19%
  - 22. NM 5.00%
  - 25. ND 4.97%
  - 26. MT 4.89%
  - 31. ME 4.51%
  - 32. NH 4.46%
  - 34. WY 4.15%
  - 36-38. HI, NV, TN <4.00%
  - 41-44, 48. MS, DE, AL, KS, KY <3.00%
  - 49-51. WV, RI, SD <2.00%

## Kentucky vs. North Carolina



# What's Needed for Tech Economy?

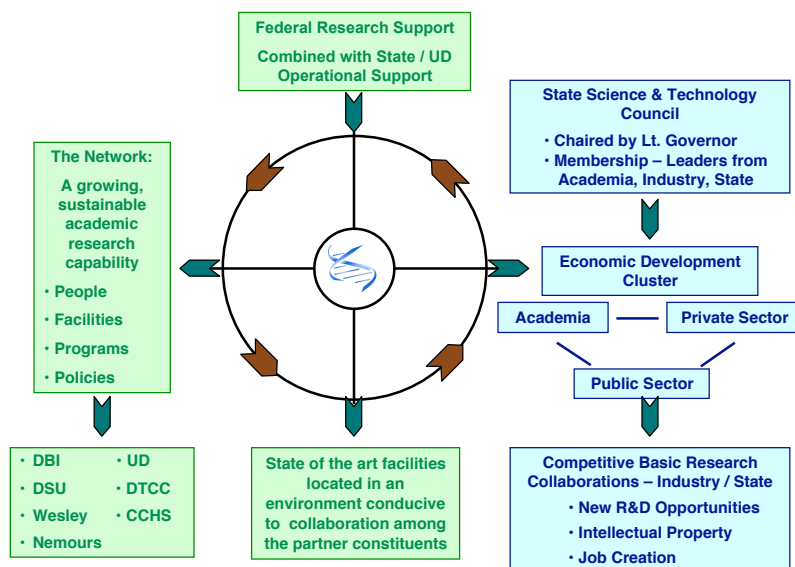
- Intellectual infrastructure
- Spillovers of knowledge
  - from universities
  - from informal networks
- Physical infrastructure
- Technically skilled workforce
- Capital
- Entrepreneurial culture
- Quality of life

Source: *Regional Advantage* by Annalee Saxenian

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## Delaware's Capability



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# Agenda

<b>8.00 am</b>	<b>Welcome, Introduction, Need for the Council</b>	<b>John Carney</b>
<b>8.30</b>	<b>Agenda, Mission, Operating Process</b>	<b>David Weir</b>
<b>8.45</b>	<b>Discussion</b>	<b>Council</b>
<b>9.15</b>	<b>Segment Introductions</b>	
	– Human Health	Nick Petrelli
	– Agriculture/ Natural Resources	Robin Morgan
	– Ecosystem Health	Don Sparks
	– Nanotechnology	Eric Kaler
	– Clean Energy	Eric Kaler
	– Education/Workforce Development	TBD
<b>10.00</b>	<b>EPSCoR Initiative</b>	<b>Steve Borleske</b>
<b>10.15</b>	<b>Break</b>	
<b>10.30</b>	<b>Human Health</b>	
	– Proposed Action	Nick Petrelli
	– Discussion	Council
<b>11.45</b>	<b>Meeting Assessment</b>	<b>Council</b>

## S&T Council Mission

Help promote science and technology  
based economic development in  
Delaware.



## S&T Council Charter

- Provide strategic advice and guidance with regard to science and technology matters that encompass research, education, policy and economic development and are important to the prosperity of Delaware. Recommendations for action will be made to the appropriate body, e.g. the Office of the Governor, Legislature, Cabinet Secretaries, DEDO, Industry Clusters, Private Sector Entities etc.

## S&T Council Charter

The Council's responsibility will encompass, for example:

- Development of a strategic Science and Technology plan, that includes public policy and work force development, and encompasses important science and technology centered segments, e.g. agriculture, human health, clean energy, nanotechnology, the environment, etc.
- Since an active Science and Technology Plan is a requirement for NSF-EPSCoR participation, the activities of the Council will also be shared with NSF. Other federal agencies e.g. NIH, USDA, DOE, etc. will be apprised of developments as appropriate.
- Oversight of the activities of the State EPSCoR Office (Stephen G. Borleske, Director), including the State's EPSCoR-RII (Research Infrastructure Improvement) Grant and other EPSCoR initiatives as appropriate.
- Help develop a trained workforce to sustain and grow new science and technology segments, e.g. life sciences, nanotechnology, etc.
- Input to the State's public education process to develop programs to stimulate students to consider careers in fields related to Science, Technology, Engineering and Mathematics (STEM).
- Serve as a State center of expertise and information regarding science and technology issues that are relevant to research, education and economic development in the State.
- Advocacy for the Council and its recommendations

## S&T Council Organization

- The Council will be chaired by Lt. Governor Carney. John O'Brien, VP-AstraZeneca will serve as Vice Chair. Membership of the Council will encompass individuals with leadership positions in Delaware industry, government and academia. Council members will be appointed by the Governor and serve for a two-year term. The Council will meet at least bi-annually, with 'Sub-Council' meetings as required, and report annually to the Governor and legislative leaders. The Council will be served by Science and Technology Sub-Committees who will assess issues and opportunities in segments of interest and prepare briefs for Council action. Administrative support will be provided to the Council and Sub-Committees.

## S&T Council Membership

- |                             |                               |
|-----------------------------|-------------------------------|
| • John Carney – Chair       | Lt. Governor                  |
| • John O'Brien – Vice Chair | AstraZeneca                   |
| • Dan Rich                  | UD                            |
| • Carolyn Thoroughgood      | UD                            |
| • Raj Parikh                | DSU                           |
| • Ileana Smith              | DTCC                          |
| • Bette Coplan              | Wesley                        |
| • David Weir                | DBI                           |
| • Joe DiPinto               | DE Legislature                |
| • David Sokola              | DE Legislature                |
| • Judy McKinney-Cherry      | DEDO                          |
| • Uma Chowdry               | DuPont                        |
| • Jim Rand                  | GE                            |
| • Brian Little              | Christiana Care               |
| • Matt Knight               | Strategic Diagnostics         |
| • Fred Melchior             | Intervet                      |
| • Steve McGrath             | Gore                          |
| • Don Cohee                 | ILC-Dover                     |
| • Ben Chien                 | Quest Pharmaceutical Services |
| • Bill Hartman              | Fraunhofer                    |

## S&T Council Organization

- The Science and Technology Sub-Committees will focus initially on six segments; Human Health, Agriculture, Complex Environmental Systems, Clean Energy, Nanotechnology and Education/Workforce Development.
- Each segment will function independently unless otherwise required. An administrative group, chaired by David S. Weir, will provide support to the Sub-Committees as follows:

– Human Health	Karl Steiner
– Agriculture and Natural Resources	David Weir
– Complex Environmental Systems	Steve Borleske
– Clean Energy and Nanotechnology	Michael Bowman
– Education and Workforce Development	Jeanette Miller
– Council Administration	Cyndi Jumper
– Program Finance	Dave McCarren
– Legislature Liaison	Paul Sample

## S&T Subcommittees

### • Human Health

– Nicholas Petrelli – Lead	Helen F. Graham Cancer Center
– Daniel Carson	UD - Biology
– Brian Little	Christiana Care Health System
– Tommy Frederick	Delaware State University
– Vicky Funanage	AI DuPont Children's Hospital
– Glen Gormley	AstraZeneca
– Larry Miller	Delaware Technical & Community College
– Lisa Plowfield	UD - Nursing
– Karl Steiner	DBI

## S&T Subcommittees

### • Agriculture and Natural Resources

- |                       |                         |
|-----------------------|-------------------------|
| – Robin Morgan – Lead | UD - Agriculture        |
| – John Bedbrook       | DuPont                  |
| – Kenneth Bell        | DSU- Agriculture        |
| – Konrad Kmetz        | DuPont                  |
| – Marty Ross          | DE Dept. of Agriculture |
| – Mike Scuse          | DE Dept. of Agriculture |
| – TBD                 | Schering-Plough         |
| – David Weir          | DBI                     |

## S&T Subcommittees

### • Complex Environmental Systems / Ecosystems Health

- |                     |                        |
|---------------------|------------------------|
| – Don Sparks – Lead | UD - Agriculture       |
| – Steve Borleske    | EPSCoR                 |
| – Craig Cary        | UD - Marine Studies    |
| – John Rabolt       | UD - Materials Science |

## S&T Subcommittees

- Clean Energy

- |                     |                  |
|---------------------|------------------|
| – Eric Kaler – Lead | UD - Engineering |
| – Mike Bowman       | DTP              |

## S&T Subcommittees

- Nanotechnology

- |                     |                        |
|---------------------|------------------------|
| – Eric Kaler – Lead | UD - Engineering       |
| – Mike Bowman       | DTP                    |
| – John Pierce       | DuPont                 |
| – John Rabolt       | UD - Materials Science |
| – TBD               | Gore                   |

## S&T Subcommittees

- Education and Workforce Development

- |                   |                      |
|-------------------|----------------------|
| – TBD – Lead      | TBD                  |
| – TBD             | DTCC                 |
| – TBD             | DE. Dept. Education  |
| – TBD             | State School Board   |
| – TBD             | Legislature          |
| – TBD             | Industry/Foundations |
| – Jeanette Miller | DBI                  |

## Education and Workforce Development

- **A skilled workforce, both quality and quantity, is a critical factor in US (and Delaware) economic sustainability.**
- **Key problems identified**
  - Middle School often described as the “Wasteland”
    - Lack of student interest in Math and Science
    - Issues with curriculum and teacher certification
    - Sets up problems for high school
  - Diversity
  - Adequate math and science teacher training
  - Drop out rate (High school / community college)
- **S&T Council Role**
  - Areas of concentration?
  - Who shall lead?